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09/715,275	11/17/2000	Jerchen Kuo	ALLOP-002	6576

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EXAMINER
HOANG, THAI D

ART UNIT	PAPER NUMBER
2667	13

DATE MAILED: 08/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/715,275	KUO ET AL.	
	Examiner	Art Unit	
	Thai D Hoang	2667	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 03 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *Amendment fied on May 09, 2003* .

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,6-14,19-24,26-49,52-65 and 67-119* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *73-119* is/are allowed.

6)☒ Claim(s) *1-4,6-10,12-14,19,21-24,26-30,32-39,41-45,47-49,53-60,62-65 and 67-71* is/are rejected.

7)☒ Claim(s) *11,20,31,40,46,52,61 and 72* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

11)☐ The proposed drawing correction filed on _____ is: a)☐ approved b)☐ disapproved by the Examiner.

If approved, corrected drawings are required in reply to this Office action.

12)☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

13)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____ .

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

14)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).

a) ☐ The translation of the foreign language provisional application has been received.

15)☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ .
4) ☐ Interview Summary (PTO-413) Paper No(s). _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: .

DETAILED ACTION

Claim Objections

1. Claim 105 is objected to because of the following informality:

Claim 105, line 24, the statement "end-***bf***-packet-fragment" should be changed to -- end-of-packet-fragment--

Appropriate correction is required.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-4, 6-9, 12-14, 21-24, 26-29, 41-44, 62-65, and 67-70 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graves US Patent No. 6,198,558 B1.

2.1 Regarding claims 1, 12 and 21, Graves discloses an improved access system for use in a fiber-in-the-loop communication network. The system comprises:

an optical line terminal (host digital terminal; fig. 2B and 3B, element HDT) and a plurality of optical network units (fig. 2B and 3B, elements ONU) connected to OLT by a passive optical network (element 30) in which downstream data is transmitted from OLT to ONU and upstream data is transmitted from ONUs to OLT over a passive optical network. Graves teaches that the OLT transmits downstream data over a passive optical network in variable length packets (fig. 2B, 3A-B; col. 12, lines 57-67; col. 22, lines 42-49.); and the ONUs transmit upstream data over a passive optical network

within ONU specific time slots utilizing time division multiplexing (fig. 2A and 3A), wherein ONU-specific time slots are filled with multiple variable length upstream packets (fig. 2B, 3A-B; col. 12, lines 57-67; col. 22, lines 42-49.)

Graves does not disclose that the variable length upstream and downstream packets are formatted according to IEEE 802.3 standard. However, the family of IEEE 802.3 standard is a well-known standard, which is applied in many telecommunication systems in Networks. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt IEEE 802.3 standard into Graves's system for economic reasons since IEEE 802.3 is a widely applied in the network. It, therefore, could be able adapt with conventional system operated in the network.

2.2 Regarding claims 2, 13, 22, 42 and 63, Graves does not disclose that the variable length upstream and downstream packets are formatted according to IEEE 802.3 standard. However, the family of IEEE 802.3 standard is a well-known standard, which is applied in many telecommunication systems in Networks.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt IEEE 802.3 standard into Graves's system for advantages cited above with respect to claim 1 in paragraph 2.1.

2.3 Regarding claims 3-4, 6-7, 14, 23-24, 26-27, 43, 64-65 and 67-68, Graves does not disclose that the lengths of the variable-length upstream and downstream packets include the lengths of an IP datagrams plus packet overhead. However, IP packets are well-known in the telecommunication field.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt IP packets into the system disclosed by Graves for advantages cited above with respect to claim 1 in paragraph 2.1.

2.4 Regarding claims 8, 28 and 69, Graves does not teach the variable length upstream and downstream packets are formatted according to IEEE 802.3 standard, and upstream and downstream data include IP datagrams.

The family of IEEE 802.3 standard and IP packet are well-known in the art, which are applied in many telecommunication systems.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt IEEE 802.3 standard and internet protocol into Graves's system for advantages cited above with respect to claim 1 in paragraph 2.1.

2.5 Regarding claims 9, 29, and 70, Graves does not teach that the OLT includes a fragment buffer for storing packets transmitted from ONUs (upstream); and that the ONUs include fragment buffers for storing packets that are to be transmitted from ONUs. However, buffering data is used in almost communications equipment.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to add buffers to Graves's system in order to control data flow between ONUs and OLT.

2.6 Regarding claim 41, Graves teaches that the OLT transmits downstream data over a passive optical network in variable length packets (fig. 2A-3B, col. 12, lines 57-67; col. 22, lines 42-49); transmitting downstream synchronization markers (address field in fig. 2A and 3A; col. 7, lines 20-22 and lines 52-55, col. 10, lines 39-41) at

constant time intervals (125μs); and the ONUs transmit upstream data over a passive optical network (30) within ONU specific time slots utilizing time division multiplexing (fig. 2A and 3A), wherein ONU-specific time slots are filled with multiple variable length upstream packets (fig. 2B, 3A-B; col. 12, lines 57-67; col. 22, lines 42-49.)

Graves does not disclose that the variable length upstream and downstream packets are formatted according to IEEE 802.3 standard. However, the family of IEEE 802.3 standard is a well-known standard, which is applied in many telecommunication systems in Networks. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt IEEE 802.3 standard into Graves's system for advantages cited above with respect to claim 1 in paragraph 2.1.

2.7 Regarding claim 44, Graves discloses that the ONU-specific time slots are filled with multiple variable length upstream packets (fig. 2B, 3A-B; col. 12, lines 57-67; col. 22, lines 42-49.)

2.8 Regarding claim 62, Graves discloses that the system comprises:

an optical line terminal (host digital terminal; fig. 2B and 3B, element HDT) and

a plurality of optical network units (fig. 2B and 3B, elements ONUs) connected to OLT by a passive optical network (element 30) in which downstream data is transmitted from OLT to ONU and upstream data is transmitted from ONUs to OLT over a passive optical network. Graves teaches that an OLT transmits downstream data over a passive optical network in variable length packets (fig. 2B, 3A-B; col. 12, lines 57-67; col. 22, lines 42-49) and downstream synchronization marker (fig. 2B and 3B, address field; col. 7, lines 20-24, lines 52-55; col. 10, lines 38-41) at constant time intervals (fig. 2A, 3A;

time interval 125μs); and the ONUs transmit upstream data over a passive optical network within ONU specific time slots utilizing time division multiplexing (fig. 2A and 3A), wherein ONU-specific time slots are filled with multiple variable length upstream packets (fig. 2B, 3A-B; col. 12, lines 57-67; col. 22, lines 42-49.)

Graves does not disclose that the variable length upstream and downstream packets are formatted according to IEEE 802.3 standard. However, the family of IEEE 802.3 standard is a well-known standard, which is applied in many telecommunication systems in Networks. It would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt IEEE 802.3 standard into Graves's system for advantages cited above with respect to claim 1 in paragraph 2.1.

Claims 10, 19, 30, 32-39, 45, 47-49, 53-60 and 71 are rejected under 35 U.S.C. 103(a) as being unpatentable over Graves in view of Keenan et al, US Patent No. 6,215,789 B1, hereafter referred to as Graves and Keenan respectively.

2.9 Regarding claims 10, 19, 30, 45, and 71, Graves does not discloses that the system comprises a fragment unit for splitting a variable-length upstream packet into first and second packet fragments; and adding an end-of-packet-fragment code to the first packet fragment and adding a start-of-packet-fragment code to the second packet fragment. However, this feature is disclosed in Keenan's invention (col. 10, lines 40-49.)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the packet fragment method disclosed by Keenan into Graves' system in order to utilize the bandwidth of the system for transmission.

2.10 Regarding claim 32, Graves discloses an improves access system for use in a fiber-in-the-loop communication network, which comprises:

an optical line terminal (host digital terminal; fig. 2B and 3B, element HDT) and

a plurality of optical network units (fig. 2B and 3B, elements ONUs) connected to OLT by a passive optical network (element 30) in which downstream data is transmitted from OLT to ONU and upstream data is transmitted from ONUs to OLT over a passive optical network (30). Graves teaches that the OLT transmits downstream data over a passive optical network in variable length packets; and the ONUs transmit upstream data over a passive optical network within ONU specific time slots utilizing time division multiplexing (fig. 2A and 3A; col. 6, lines 55-57), wherein ONU-specific time slots are filled with multiple variable length upstream packets (fig. 2B, 3A-B; col. 12, lines 57-67; col. 22, lines 42-49.)

Graves does not disclose that the OLT and ONU include fragment buffers. Also, Graves does not disclose that the system comprise a fragment unit for splitting a variable-length upstream packet into first and second packet fragments; and adding an end-of-packet-fragment code to the first packet fragment and adding a start-of-packet-fragment code to the second packet fragment. However, buffering data is used in almost all communications equipments. Furthermore, Keenan discloses fragment packet method as mentioned in paragraph 2.9.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to add buffers into Graves' system in order to control data flow

between ONUs and OLT; and adapt the fragment method disclosed by Keenan into Graves' system in order to utilize the bandwidth of the system for transmission.

2.11 Regarding claims 33, 36, 48, 54 and 57, both Graves and Keenan do not disclose that the variable length upstream and downstream packets are formatted according to IEEE 802.3 standard. However, the family of IEEE 802.3 standard is a well-known standard, which is applied in many telecommunication systems in Networks.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt IEEE 802.3 standard into Graves's system for advantages cited above with respect to claim 1 in paragraph 2.1.

2.12 Regarding claims 34-35, 37-38, 49, 55-56 and 58-59, both Graves and Keenan do not disclose that the lengths of the variable-length upstream and downstream packets include the lengths of an IP datagrams plus packet overhead. However, IP packets are well-known in the telecommunication field.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt IP packets into the system disclosed by Graves for advantages cited above with respect to claim 1 in paragraph 2.1.

2.13 Regarding claims 39 and 60, both Graves and Keenan do not teach the variable length upstream and downstream packets are formatted according to IEEE 802.3 standard, and upstream and downstream data include IP datagrams. However, the family of IEEE 802.3 standard and IP packet are well-known in the art, which are applied in many telecommunication systems.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt IEEE 802.3 standard and internet protocol into Graves's system for advantages cited above with respect to claim 1 in paragraph 2.1.

2.14 Regarding claim 47, Graves teaches that the OLT transmits downstream data over a passive optical network in variable length packets; and the ONUs transmit upstream data over a passive optical network within ONU specific time slots utilizing time division multiplexing (fig. 2A and 3A), wherein ONU-specific time slots are filled with multiple variable length upstream packets (fig. 2B, 3A-B; col. 12, lines 57-67; col. 22, lines 42-49.) Graves does not discloses that the system comprise a fragment unit for splitting a variable-length upstream packet into first and second packet fragments; and adding an end-of-packet-fragment code to the first packet fragment and adding a start-of-packet-fragment code to the second packet fragment. However, this feature is disclosed in Keenan's invention (col. 10, lines 40-49.)

It would have been obvious to one having ordinary skill in the art at the time the invention was made to adapt the packet fragment method disclosed by Keenan into Graves' system for the same purpose as mentioned in paragraph 2.9.

2.15 Regarding claim 53, Graves discloses that the system comprises:

an optical line terminal (host digital terminal; fig. 2B and 3B, element HDT) and

a plurality of optical network units (fig. 2B and 3B, elements ONUs) connected to OLT by a passive optical network (element 30) in which downstream data is transmitted from OLT to ONU and upstream data is transmitted from ONUs to OLT over a passive optical network. Graves teaches that the OLT transmits downstream and upstream data

over a passive optical network in variable length packets (fig. 2B, 3A-B; col. 12, lines 57-67; col. 22, lines 42-49.), therefore, Graves' system inherently comprises a means (processors 141) for formatting downstream and upstream data into variable length packets. Furthermore, Graves discloses that the ONUs transmit upstream data over a passive optical network (30) within ONU specific time slots utilizing time division multiplexing (fig. 2A and 3A, col. 7, lines 48-55), in order to avoid collisions with upstream packets from other ONUs. Graves does not disclose that the OLT and ONU include fragment buffers. Also, Graves does not disclose that the system comprise a fragment unit for splitting a variable-length upstream packet into first and second packet fragments; and adding an end-of-packet-fragment code to the first packet fragment and adding a start-of-packet-fragment code to the second packet fragment. However, buffering data is used in almost communications equipment. Furthermore, Keenan discloses fragment packet method as mentioned in paragraph 2.9.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to add buffers into Graves' system in order to control data flow between ONUs and OLT; and adapt the fragment method disclosed by Keenan into Graves' system for the same purpose as mentioned in paragraph 2.9.

Allowable Subject Matter

3.1 Claims 11, 20, 31, 40, 46, 52, 61, and 72 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

3.2 Claims 73-119 are allowed.

The following is a statement of reasons for the indication of allowable subject matter:

Graves, US Patent No. 6,198,558 B1, discloses an improved access system for use in a fiber-in-the-loop communication network. Keenan et al, US Patent No. 6,215,789 B1, discloses a method and apparatus for the transmission of data packet over a single network fabric.

Each of independent claims 73, 80, 83, 90, 98, 102, 105 and 113 recites:

A point-to-multipoint optical communications system comprising: an optical line terminal (OLT); and a plurality of optical network units (ONUs) connected to said OLT by a s passive optical network in which downstream data is transmitted from said OLT to said ONUs over said passive optical network and upstream data is transmitted from said ONUs to said OLT over said passive optical network; said OLT transmitting downstream data over said passive optical network in variable-length downstream packets; *wherein the OLT unit includes fragment logic for:*

identifying said end-of-packet-fragment code of said first packet fragment;

buffering said first packet fragment in said OLT fragment buffer;

identifying said start-of-packet-fragment code of said second packet fragment; and

reconstructing said variable-length upstream packet from said first and second packet fragments as recited in claim 73, 80, 83, 90, 98, 102, 105 and 113.

Both Graves and Keenan do teach or fairly suggest the features as shown above.

Response to Arguments

4. Applicant's arguments filed on May 09, 2003 have been fully considered but they are not persuasive.

4.1. Regarding claims 1, 12 and 21, in the remarks pages 5-7, Applicants argue that the reference *"does not disclose the downstream transmission of asynchronous variable-length packets or the upstream transmission of asynchronous multiple variable length packets"*. Examiner respectfully disagrees. Applicants are directed to column 3, lines 51-67 and figures 1 and 2, where reference discloses:

> *In a fiber optic communication system comprising a host digital terminal (HDT) for connection to a core communications network and connected by optical fiber to at least one optical network unit (ONU) for interfacing to a plurality of different subscriber loops, wherein digital data traveling from the core network to one of the plurality of subscriber loops undergoes a change of format from one of a plurality of first data formats* [i.e. ATM format] *to one of a plurality of second data formats* [i.e. frame relay format], *and wherein digital data traveling from each of the plurality of subscriber loops to the core network undergoes a change of format from one of the plurality of second data formats* [i.e. frame relay format] *to one of the plurality of first data formats* [i.e. ATM format], *the invention may be summarized according to a first broad aspect as the improvement wherein signal processing functions for converting the digital data from any first data format* [i.e. ATM format] *to any second data format* [i.e. frame relay format] *and vice versa are executed in the HDT.*

It indicates that the reference clearly discloses the *host digital terminal* (HDT) (figures 1A-1B, 2B and 3B) convert packets from ATM format applied in the core network 23 to the frame relay format packets and transmit the frame relay packets to

the subscriber through Optical Network Units (ONU) for downstream and vice versa for upstream. Therefore, Examiner believes that the variable length packets are transmitted in both downstream (form HDT to ONU) and upstream (from ONU to HDT) of the system disclosed by Graves.

Furthermore, Applicants' arguments with respect to claims 1, 12 and 21 for a new limitation "upstream data is formatted according to IEEE 802.3" have been considered but are moot in view of the new ground(s) of rejection.

4.2. Regarding claim 41, in the remarks pages 7-8, Applicants argue about the variable length packets for downstream transmissions. This argument is responded in previous paragraph with respect to claim 1, 12 and 21. Also, on page 8, lines 19-23, Applicants argue "Applicant's system allows frames to be sent asynchronously, but uses an out-of-band sync marker to carry the clock reference to the ONU; these markers appear in between the IEEE frames so timeslot information is communicated as separate messages to provide the reference to the ONU". Examiner believes that this argument is not relevant because it is directed to subject matter not found in the claims

Furthermore, Applicants' arguments with respect to claim 41 for new limitation "upstream data is formatted according to IEEE 802.3" have been considered but are moot in view of the new ground(s) of rejection.

4.3. Regarding claim 62, Applicant's argument is responded in the paragraph 4.1 with respect to claims 1, 12 and 21.

4.4. Regarding claims 2-10, 13-14, 19, 22-30, 32-39, 42-43, 47-51, 53-60, and 63-71, in the remarks, pages 11-20. Applicants argue about claim rejection under 35 U.S.C

103 obviousness for adapting IEEE 802.3 standard into Graves' system with a buffer added. In response to applicant's argument that the Examiner's conclusion of obviousness is based upon improper hindsight reasoning, it must be recognized that any judgment on obviousness is in a sense necessarily a reconstruction based upon hindsight reasoning. But so long as it takes into account only knowledge which was within the level of ordinary skill at the time the claimed invention was made, and does not include knowledge gleaned only from the applicant's disclosure, such a reconstruction is proper. See *In re McLaughlin*, 443 F.2d 1392, 170 USPQ 209 (CCPA 1971).

Also, Applicants' argument about the variable length packets for downstream and upstream transmissions is responded in previous paragraph 4.1 with respect to claims 1, 12 and 21.

Conclusion

5. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thai D Hoang whose telephone number is (703) 305-3232. The examiner can normally be reached on Monday-Friday 8:30am-5:00pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Chi Pham can be reached on (703) 305-4378. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9314 for regular communications and (703) 872-9314 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 305-4700.

Thai Hoang
August 10, 2003

CHI PHAM
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2600 8/11/03